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Trends in Asthma Hospitalizations in Rhode Island

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Exacerbations are unpredictable in the lifetime of an asthmatic. The need for acute asthma care is reduced when triggers are avoided and relapses are promptly identified and controlled with appropriate medications. Between 1990 and 1999, rates of hospitalization with a principal diagnosis of asthma decreased substantially in Rhode Island. Previous reports have shown that asthma hospitalizations have been declining in the United States general population and stabilizing in old and very young asthmatics.[1,2,3] Although Rhode Island is experiencing a similar decline, this trend is not uniform in the entire population. We found differences in hospitalization by age, gender, and race when asthma was the principal diagnosis at discharge, and an increasing trend when asthma was an additional diagnosis. The purpose of this report is to describe changes in asthma hospitalizations in Rhode Island between 1990 and 1999 and to discuss the relevance of hospital discharge information for statewide asthma surveillance.

Methods. Hospital morbidity data was obtained from the Rhode Island Hospital Discharge Data Set (HDD), described previously in this journal.[4] Because the HDD does not contain unique identifiers, we considered asthma hospitalizations as independent events and did not adjust rate estimates for repeated hospital admissions. Separate hospitalization rates were determined for discharges with principal and additional diagnosis of asthma for the years 1990-1999. Further analysis of asthma as an additional diagnosis was beyond the scope of this report. However, we calculated these rates because asthma may increase the severity of other primary conditions, complicate their treatment, prolong hospital stay, and/or increase the need for follow-up care after discharge.

We included discharges of out-of-state residents in the calculation of hospitalization rates, as data on discharges of Rhode Island residents from out-of-state hospitals was unavailable. Hospital discharge rates (crude, variable-specific and standardized) were calculated using United States Census Bureau estimates for Rhode Island. Age-adjusted rates were calculated by the direct method using the combined populations of 1990 and 1999 as the standard. We excluded all discharges without race identifiers and reported race-specific hospitalizations as white and non-white rates. Hispanics were included in the latter category.

Results. There was a 20% reduction in the age-adjusted rate of hospitalizations with a principal diagnosis of asthma in Rhode Island, from 171 discharges per 100,000 in 1990 to 136 per 100,000 in 1999 (Figure 1). Rates increased by 12% at the beginning of the period to a decade-high rate of 191 discharges per 100,000 in 1993. This was followed by a steady decline until 1998. The 20% drop between 1997 and 1998 constitutes the largest single-year decline in the decade. In 1999, the discharge rate grew by 9% to 136 per 100,000, the first increase in six years.

Between 1990 and 1999, rates did not decline uniformly across all age categories (Figure 2). The population 65 and older experienced the largest reduction in hospital discharges (down 46%) followed by age groups 50-64 (down 36%), 5-19 (down 20%), 35-49 (down 16%) and 0-4 (down 2%). Rates for 20-34 year-olds increased by 14% between 1990 and 1999. In addition to age-specific trends, discharge rates for 0-4 year-olds were consistently more than double the rates of other age categories.

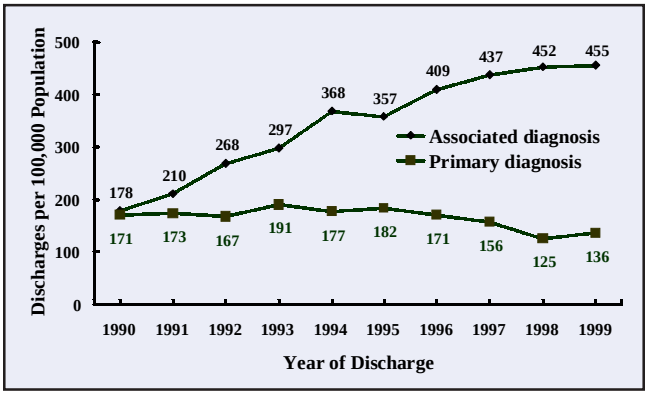

Figure 1. *Hospital Discharges with Diagnosis of Asthma per 100,000 Population (Age-Adjusted), by Principal and Additional Diagnosis and Year of Discharge, Rhode Island, 1990-1999.*

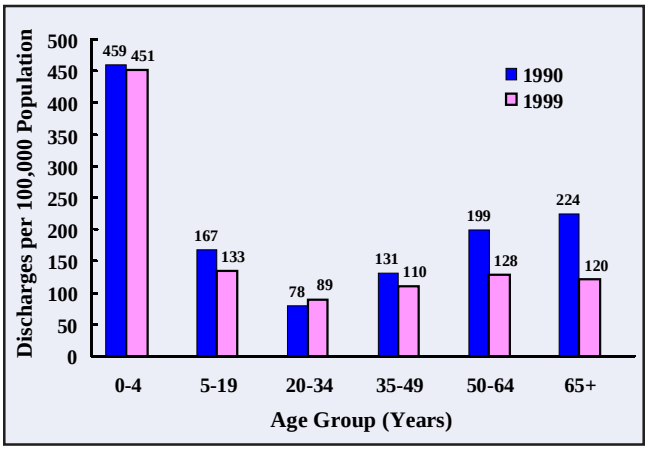

Figure 2. *Hospital Discharges with Principal Diagnosis of Asthma per 100,000 Population, by Age Group and Year of Discharge, Rhode Island, 1990 and 1999.*

A pronounced upward trend was observed for discharges where asthma was an additional diagnosis (Figure 1). Asthma-associated discharges increased 2.6 times, from 177 per 100,000 in 1990 to 455 discharges per 100,000 in 1999. Secondary-to-primary discharge ratios increased from 1.04 in 1990 to 3.35 in 1999. The limited analysis of asthma-associated discharges showed varying trends for conditions with asthma as a complication. For example, the proportion of all hospitalizations with an associated diagnosis of asthma that had a respiratory condition as a primary diagnosis declined from 23% in 1990 to 14% in 1999. In contrast, the proportion of asthma-associated discharges with a principal condition of delivery or complications of pregnancy had a three-fold increase (4% to 12%) during this period.

Gender-specific discharge rates for primary diagnosis of asthma were consistently higher for females than males (Figure 3). Rate differences decreased slightly, from 51 discharges per 100,000 in 1990 to 43 per 100,000 in 1999. We also determined asthma hospitalizations by race and found a substantially higher discharge rate in the non-white population. The rates for non-whites ranged between 3.9 times the white rate in 1991 and 1993 to 5.3 times the white rate in 1995 and 1999 (Figure 3).

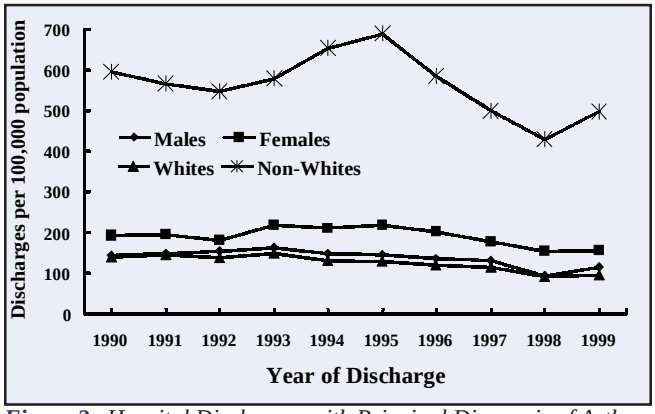

Figure 3. *Hospital Discharges with Principal Diagnosis of Asthma per 100,000 Population, by Gender and White/Non-White and by Year of Discharge, Rhode Island, 1990-1999. (Non-White includes All Persons of Hispanic/Latino Origin).*

Discussion. Reductions in inpatient care for asthma have been linked to drug effectiveness, treatment guidelines, management practices, and patient education improvements. Several states, Rhode Island included, are currently developing asthma control plans with funding from the federal Centers for Disease Control and Prevention, state legislatures, and private organizations. Support for these local initiatives occurs at a time of increasing asthma incidence and prevalence, and of declining asthma hospitalizations and deaths.

The effective use of HDD to track episodes of severe asthma exacerbations is important for understanding the health and resource implications of asthma. In addition, identifying asthma morbidity trends and the distribution of asthma within the population is essential to identify groups where the greatest reductions in very severe asthma episodes can be attained. Asthma hospitalizations represent severe events that have effective means of prevention and treatment. Decreases in the observed discharge rates for asthma as a primary diagnosis and for asthma as a diagnosis secondary to other respiratory conditions may reflect improvements in asthma management in Rhode Island. However, hospitalizations of children ages 0-4, females, and non-whites were disproportionately represented in the rates and constitute likely populations for interventions.

Findings suggest that hospital discharge rates, ratios, and proportions for selected groups defined by socio-demographic characteristics may be useful for the surveillance of populations with acute asthma and asthma co-morbidity. This is especially relevant for tracking improvements in asthma management in ambulatory care that may result from targeting asthmatic populations at high risk of inpatient care. Patients, providers, and institutions have the shared responsibility of fostering continued improvements through better compliance, patient education, and health care benefits. Ultimate success in improving asthma management outcomes resides in the fact that decreases in exacerbations leading to inpatient care, respiratory complications, or death may be related to appropriate and sustained ambulatory treatment and support. Important questions that remain include how to apply findings to the evaluation of asthma surveillance and management efforts, and how to pursue additional analysis to elucidate the long-term increase in asthma-associated hospitalizations and the implications of that increase for asthma management.

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References

1. Evans R, Mullally DI, Wilson RW, et al. National trends in the morbidity and mortality of asthma in the US: prevalence, hospitalization and death from asthma over two decades: 1976-1984. *Chest* 1987;91:65S-74S.
2. Gergen PJ, and Weiss KB. Changing patterns of asthma hospitalizations among children: 1979 to 1987. *JAMA* 1990;264:1688-92.
3. Vollmer WM, Osborne ML, and Buist AS. Twenty-year trend in the prevalence of asthma in chronic airflow obstruction in an HMO. *American Journal of Respiratory Critical Care Medicine* 1998;157:1079-84.
4. Buechner J. Trends in Asthma Morbidity and Mortality, Rhode Island, 1988-1997. *Med&Health/RI* 1999;82:261-2.

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